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Integrating Social Science Research with Wildland Fire Science: Assessing Values at Risk from the Bitterroot Community Wildfire Protection Plan

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April 2005

This research was completed through the support of the Research Joint Venture Agreement, 01-JV-11222044-251, between the Aldo Leopold Wilderness Research Institute, Rocky Mountain Research Station, USDA Forest Service, and the University of Montana.

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01-JV-11222044-251

Executive Summary

The development of Community Wildfire Protection Plans (CWPP) under the 2003 Healthy Forest Restoration Act (HFRA) has provided opportunities for rural communities in fire-adapted ecosystems to express their interests regarding methods to reduce risk to lives and properties from wildfires. The Bitterroot CWPP was one of the first developed in the interior West, preceding the passage of HFRA, and its production assembled a diversity of Bitterroot residents to articulate actions to reduce hazardous fuels and protect self-identified "values at risk." It also allowed the Bitterroot RC&D, a local advocate for resource management and economic development, to acquire $1million in grants from National Fire Plan allocations for hazardous fuel reduction on private lands. During 2004 and 2005, hazardous fuel reduction activities have been carried out on over 700 acres of private lands in the Bitterroot Valley under the auspices of the CWPP.

To understand how Bitterroot residents regard the efficacy of the actions recommended and carried out under CWPP guidance, 23 individuals representing a diversity of interests were interviewed about the CWPP in the fall and spring of 2004-05. People were asked to describe how recommended fuel treatments conformed to people's attitudes, values, and community norms regarding forest lands in the Bitterroot, and whether the treatments were addressing priority values at risk. In addition, the interviews inquired on the anticipated effect of the CWPP on adjacent wilderness areas in the Bitterroot.

The action-orientation of the Bitterroot CWPP and the grant monies acquired for treatments have created a positive impression of the CWPP among many Bitterroot residents regarding the potential to reduce risk from wildfire for residents of the wildland urban interface (WUI) in the Bitterroot Valley. As would be expected, Bitterroot residents consider lives and property as the most important values at risk. Actions recommended by the CWPP to advance the adoption of clean-up operations in the "home ignition zone" appear to be universally supported. Once treatment options leave the home ignition zone, however, agreement crumbles among Bitterroot residents on the objectives of treatments and the manner in which they are carried out. Uncertainty on the efficacy of hazardous fuel reduction treatments in the wildland urban interface revolve around several poles – the effectiveness in reducing risk, the promotion of forest conditions that are healthier and/or more aligned with natural processes, the creation of unintended consequences, and the ability to sustain economic and public support for both initial and ongoing treatments.

The CWPP also brings to the surface the practical limitations of government sponsored action in a location with fierce devotion to private property interests. The ability of government authorities to mandate fuel reduction treatments on private land in the Bitterroot seems limited, at best. A more practical approach would be a package of incentives and disincentives to landowners. Raising insurance rates for non-compliant owners emerged as a preferred disincentive, and active educational programs as well as well-distributed, visible examples of fuel treatments across neighborhoods emerged as favored incentives.

Results from this research are inconclusive regarding the effect of the CWPP on management opportunities in designated wilderness. If anything, results seem to indicate that the management of wildland use fires in wilderness will be guided more by physiographic, weather, and demographic conditions instead of the intensity of treatments in the wildland urban interface.

Introduction

The threats associated with wildfires and related fuel treatments in fire adapted ecosystems have received considerable public attention in the past decade, and one of the places where residents have become most acutely aware of wildfire's impact is in the Bitterroot Valley of Montana. Close to 350,000 acres burned in and around the Bitterroot Valley during the summer of 2000, and subsequent management actions to recover from the fires and prepare residents for future events continue to generate controversy. This research examines how the development and implementation of the Bitterroot Community Wildfire Protection Plan (CWPP) has addressed the interests of Bitterroot residents regarding their forests and communities.

While awareness about the role of fire as an integral part of many ecosystems in the West has developed slowly over the past 80 years (Arno and Allison-Bunnell 2000), the intersection of fuel management activities with social expectations for wildfire risk reduction remain less well understood. One of the most serious challenges for forest managers is finding the combination of activities that reduces the potential for wildfire damage while sustaining other highly valued forest characteristics and ecological processes. This becomes especially difficult as increasing populations throughout the intermountain west migrate to exurban developments known as the "wildland urban interface," or WUI. In short, there are more people in more vulnerable situations, but there is uncertainty on the best means to provide protection from wildfires while keeping the forest healthy.

This research will use the Bitterroot Valley as a case study to provide insight into public perceptions of appropriate action to protect values at risk from wildfire. A case study is a common technique to gather preliminary insight into a complex, emergent phenomenon where multiple social pressures and variable potential outcomes are present (Yin 1984). The development of the CWPP over the past two years offers a useful lens into public attitudes and values, since the intention and application of its development at the community scale attempted to gather, assimilate, and synthesize, in a collaborative

fashion, the interests of Bitterroot residents. The research has the following three objectives:

- Understand the attitudes, values, and community norms regarding wildfire management and fuel treatments that are reflected in the Bitterroot CWPP;
- Reveal the relative strengths of the communities' self identified "values at risk" as they are reflected within priorities for action in the Bitterroot CWPP; and
- Within the context of fire management, understand any special priorities for action or tradeoff evaluations that are attributed to the presence of wilderness.

To realize this objective, a series of in-depth interviews were conducted with a purposive sample of 23 Bitterroot Valley residents during the fall and winter of 2004-2005. These respondents represented a diversity of views regarding the management of forests. Their experience in forest management, hazardous fuel reduction projects, wildfire suppression, and environmental protection allow them to provide a depth of consideration and reflection on the tensions and value tradeoffs of forest management interventions, as well as the practical constraints in bringing to fruition natural resource plans. Their responses provide the basis for recognizing the role of the Bitterroot CWPP in manifesting the attitudes and values of Bitterroot residents regarding fuel management treatments.

Background

Wildland fire has been the primary ecological disturbance shaping vegetation patterns in the western United States prior to the 20th century (Pyne 1982). Yet since the major fires in Idaho and western Montana in 1910, government fire polices have followed an aggressive suppression strategy to protect investments in timber resources and prevent harm to people and communities located in forested zones. These policies over the past century have created new vegetative conditions, especially in the drier, pine-dominated forests, where wildfires are hotter, larger, and more difficult to combat (Arno and Brown 1991, Hessburg and Agee 2003, Mutch 1994). Other factors have exacerbated severe fire behaviors, such as the removal of forest overstories in commercial logging operations (Quigley and Arblebide 1997), climate change (Flannigan 2000), and a lingering western drought.

Simultaneously, the human population in the west has grown rapidly in the last two decades, with expanding populations in low-elevation, fire adapted ecosystems, especially those with high amenity values based on the natural environment (Johnson

1999, Rudzitis 1999, McCool and Kruger, 2003). The Bitterroot Valley is a particularly affected zone for this population growth, with Ravalli County's population increasing from 25,010 in 1990 to 35, 811 in 1999, a 43% increase (Swanson 2001). This growth occurs both in rural towns and in the ex-urban environment, and without a comprehensive land use plan to constrain the placement of individual houses, new construction stretches further and further into previously undeveloped private lands.

Despite the threat of wildfire in communities, residents often seem unwilling or reluctant to take measures to reduce risk from wildfire on their property (Cornter et al. 1990; Gardner et al.1987). Although prior research demonstrates that ex-urban residents are capable of discerning the potential wildfire hazards presented by vegetation, it also shows that people have other, sometimes more powerful interests for their property, especially sustaining a preferred visual aesthetic (Daniel et al. 2002). Hazardous fuel treatments that do not consider the multiple values people place on their trees – for beauty, bird habitat, or privacy – there is little likelihood that people will adopt these treatments.

Research that examines human actions to reduce risk has revealed that individuals undertake complex, highly situational cause/effect evaluations that involve a person's willingness to assume costs and make sacrifices (Daniel [in press], Gregory 2002, Slovic 2000). Generally, if personal costs are high, in terms of time, effort, or financial burden, people are less likely to take actions to reduce risk, even if the potential consequences are high (Fishhoff et al. 1979). Additionally, if the probability of the risk event is low, people are typically unmotivated to take preventative action to reduce risk (Kunreuther et al. 2004). People also prefer to look to others to implement risk reduction programs – such as their neighbors or government agents – rather than exert the forethought or personal commitment to reduce risk (Daniel [in press]).

Adding to this complexity, the actual effectiveness of risk reduction activity prior to a wildfire remains an ongoing debate in the forest management community. Research by Cohen (2000) indicates that the most critical area for the protection of structures from wildfire occurs within 30-40 meters of a household in what has been called the "home ignition zone." Through mitigations of common fuel problems such as firewood stacks next to houses, wooden porch furniture, overhanging trees, or pine needles in gutters or windowsills, people can substantially reduce the risk of the structure burning during a fire. However, during a typical wildfire event, firefighting crews are dispatched to houses to provide special protection via fire resistant foaming, and it can be the presence of crews with water and foam that can save a house. Firefighting efforts also can determine if a fire reaches a house or not, but whether a crew actually provides suppression services in a given area depends on a variety of fire behavior conditions and safety requirements. Large scale "crown" fires are very difficult to suppress by firefighting personnel, so a widespread justification for hazardous fuel reduction treatments is to reduce the potential of crown fires. Research by Pollett and Omi (2002) and Martinson and Omi (2001) has shown that thinning treatments that reduce stand density in mixed Douglas fir/Ponderosa pine stands (as are common in the Bitterroot) lower the probability of ignitions carrying into crown fires.

Survey research has shown that the public is not in full agreement regarding the efficacy of wildland fuel treatments. Shindler (1997) observed in an Oregon sample that people generally supported fuel treatments, favoring mechanical thinning treatments over prescribed burns. In a study by Winter and Fried (2000) people recognized the need to treat fuels, but hadn't actually done much on their own property. This study and another (Winter et al. 2002) also demonstrated that some survey respondents expressed doubts that fuel treatments would actually be that effective in stopping fire, and acknowledged a downside to both mechanical thinning (cost and vegetation amenity) and prescribed fire (smoke and potential escape). Recently published research by Vogt and others (2005) applied the theory of reasoned action to the prediction of homeowner's approval of fuel management in the wildland urban interface. This work recognized that across their sample in Michigan, California, and Florida, people would justify fuel treatments if they improved firefighting efforts, but people were mixed in their beliefs on the benefits to wildlife habitat, scenery, or restoring wildlands to a more natural condition. Trust in the agency implementing the hazardous fuel treatment was positively related to survey respondents' evaluation of mechanical treatments or prescribed burns.

Understanding how hazardous fuel reduction treatments are perceived by residents in the Bitterroot also raises questions about the importance of people's current views toward environmental management. Human values toward the environment are affected by cultural, historical, and political forces, all interacting with contextual situational variables (Rolston 1994; Merchant 1996). Further, people construct cultural models of how the natural environment functions and the means by which human actions either support or degrade natural processes (Kempton et al. 1995). For the last several decades, social scientists have attempted to understand people's relationship with the environment across an anthropocentric to biocentric continuum, and survey researchers such as Dunlap and Van Liere (1978), Steel and others (1994), and Olsen and others (1992) have attempted to reveal latent motivations and worldviews that affect people's responses to environmental interventions. Other research argues that historical practicalities and visionary leaders have coalesced to generate a series of land ethics, and these are more salient in understanding both societal and legal demands for resource use (Bosselman 1994). These ethics are always in a dynamic tension based on highly individualized conditions.

How these complex constructions of attitudes, values, and beliefs interact with proposed actions in a community level plan that is intended to protect "values at risk" from fire is the question at the center of this exploratory research project. Although recent research by Kneeshaw and others (2004) has identified situational factors affecting acceptable responses to wildfires, less is known about how community-level planning can lead to appropriate responses to reduce long-term risk and meet other socially valued objectives within forests.

The Bitterroot CWPP was generated through the efforts of local volunteers in the Bitterroot, many of whom had participated in an informal citizen advisory group called the Residential-Wildland Interface Task Force, which had formed in 1998 to consider issues of fire protection for rural residents. Instrumental to the function of the Task

Force was the Bitterroot Resource Conservation and Development Area, Inc., a locally-based clearinghouse for natural resource project activity and coordination supported by local governments and the USDA Natural Resources Conservation Service. Through the support and guidance of the Bitterroot RC&D, the task force had taken on a series of community education and small development projects, including a mapping project to identify areas in the county not covered by rural fire protection districts, dry hydrant placement in new residential areas, and information programs that highlighted the role of fire in dry pine ecosystems. After the dramatic fires of 2000, a series of federal level actions provided additional impetus to community-level action to address wildfire risks, most notably the development of the National Fire Plan, the 10-year Comprehensive Strategy, and the Healthy Forests Initiative.

On December 3, 2003, President Bush signed into law the Healthy Forest Restoration Act (HFRA, Pub. L. No. 108-148, 117 Stat. 1887) providing legislative authorization for "hazardous fuel reduction projects." Integral to these fuel projects in the crafting of Community Wildfire Protection Plans (CWPP), sometimes known as community-based wildland fire risk mitigation plans, or more commonly, community fire plans.

Community fire plans identify and prioritize areas for hazardous fuel reduction on federal and non-federal land, recommend various types of treatments, and identify essential community infrastructure for protection in "at-risk communities" in the wildland urban interface (WUI). An at-risk community is defined as a group of structures within or adjacent to Federal land with a condition conducive to a large-scale wildland fire disturbance event and for which a significant threat to human life and property exists. Through a collaborative planning process, CWPP's attempt to integrate the management of public lands administered by numerous agencies with private landowners and other interested parties. According to USDA Forest Service and USDI Bureau of Land Management (2004:36), "In the WUI, these plans will provide a seamless guide for fuel reduction across ownerships, identifying those treatments to be completed by public agencies and those to be completed by private landowners." While the process of crafting the plan is intended to be open and collaborative, the final decision making authority lies outside of the purview of citizens. The three entities that must mutually agree to the final contents of the CWPP include: the applicable local government (county or city), the local fire department(s), and the state entity responsible for forest management.

The CWPP's also must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types of treatments. The treatment options must outline how the treatment will protect the at-risk community and related essential infrastructure. The Society of American Foresters et al. (2004) recommend that the identity and prioritization process include establishing a community base map and community risk assessment detailing fuel hazards, risk of fire occurrence, essential infrastructure at risk, values at risk and the local preparedness and fire fighting capacity. Priorities for treatments are then determined and according to the Society of American Foresters et al. (2004:7), "should be as open and collaborative as possible. Diverse community involvement at this stage is critical to the ultimate success of the CWPP."

The final minimum requirement for a CWPP is the recommendation of treatments of structural ignitability throughout the at-risk community. The CWPP must identify and recommend measures that homeowners and communities can take to reduce the ignitability of homes and other essential structures in the community. The HFRA also instructs various Federal agencies to establish a collaborative multiparty monitoring, evaluation and accountability process when significant interest is expressed. According to the USDA Forest Service and USDI Bureau of Land Management (2004:38), this type of monitoring "can be an effective way to build trust."

In the Bitterroot, the efforts of the Residential Wildland Interface Group had generated an early version of a Community Wildfire Protection Plan even before the passage of the HFRA. Via meetings held in the fall of 2002 and winter of 2003, volunteers had generated a series of action items to reduce risk to lives and property, to provide coordination of fire suppression responsibilities, and community education on wildfire hazard. A series of subcommittees were established to deal with specific issues, and a steering committee oversaw the development of the plan. Invitations to key contacts in the Bitterroot were sent out via mail on two occasions, and advertisements of the process for developing the plan were placed in common community information sources, such as the local newspaper. All meetings to develop plan recommendations were open to the public.

This first plan, released in April 2003, covered many of the major issues that were identified in the HFRA, but did not organize its action items along the same areas of emphasis as required in the National Fire Plan 10 Year Comprehensive Strategy and the Healthy Forest Restoration Act of 2004. In order to comply with the authorities in

HFRA, and more importantly, to be able to qualify for grant monies appropriated to western states via the Forest Service's State and Private Forestry branch, the plan had to be revised to align with guidelines produced nationally. Thus, some of the same volunteers, fire chiefs, Forest Service officials, and other newly engaged valley residents revised the plan in April 2004. The plan's stated purpose also remained the same in the revision as in the original, with the only change being the addition of the final phrase, which is noted in italics in the following statement: "The purpose of this plan is to position fire protection agencies, county leaders, rural communities, valley residents, and forest owners and managers to be better prepared to protect the County's residents and its natural resources from the potentially devastating impacts of wildfire *and promote the natural role of fire in the ecosystem.*" Future references to the CWPP in this research will be based on the revised, April 2004 version of the CWPP. The plan contains four major sections and a series of appendices, with the final appendix a series of maps. The entire plan is available electronically at the Bitterroot RC&D web site, www.bitterrootrcd.org.

Because of this revision and the active pursuit by the Bitterroot RC& D for grant monies available through the Western States allotment via the National Fire Plan, the CWPP allowed the Bitterroot RC&D to acquire roughly one million dollars for hazardous fuel reduction treatments on private lands within the wildland urban interface. These treatments have been administered by a retired forester who has returned to work as a member of the Bitterroot RC&D staff to oversee the implementation of the recommended hazardous fuel reduction actions identified in the CWPP. To understand how these actions are perceived and supported by Bitterroot residents, this research explored the reaction of 23 Bitterroot residents to the fuel reduction programs that have since been initiated.

Methods

Data collection for the study utilized in-depth, semi-structured interviews with 23 residents of the Bitterroot Valley. The research utilizes a grounded theory approach where insights are drawn from the data instead of testing predetermined hypotheses (Strauss and Corbin 1990, Charmez 2004). As more and more information from those familiar with the phenomenon emerges, categories of meaning and patterns of social representation become clearer. This inductive approach encourages analysis concurrent with data collection, so testing of middle range theories can occur on subsequent observations. This dynamic process of data collection and analysis strives to ensure that the conceptualization of the phenomenon is rooted in the actual experiences of the affected population (Charmez 2004).

The process of selecting respondents applied a combination of purposive and snowball sampling. A diversity of points of view were desired to understand the range of attitudes, beliefs, and values regarding hazardous fuel reduction and the role of the CWPP in advancing the multiple interests of Bitterroot residents. Representatives of the Forest

Service, the Bitterroot RC&D, timber operators, and Friends of the Bitterroot were initially contacted in the summer of 2004 to begin the sample of residents that had been actively following forest management issues. Other respondents were than identified by those interviewed as having knowledgeable and experience with the CWPP, fire suppression, and hazardous fuel reduction treatments in the Bitterroot. The purposive sample expanded to landowners, including new and longer-term landowners, to gain insight on the incentives for residents to have fuel reduction treatments on their own land. The final group of 23 interviews contained two current Forest Service employees, three retirees from the Forest Service, two fire chiefs, four loggers, four representatives from environmental organizations, two consulting foresters, two representatives of national level natural resources policy organizations, and four unaffiliated landowners. For the sake of confidentiality of the respondents, greater detail about their occupations or positions in the relatively small Bitterroot Valley has been withheld.

Interviews were conducted at a variety of locations by two, experienced field workers in social science research. On several occasions the interviews were held in forest locations to highlight the conditions that affect the implementation of the CWPP. Interviews were audio-tape recorded and later transcribed to create full transcripts. These narrative data sets were loaded onto desktop computers with the N*VIVO softward to assist in coding subsequent data analysis. Interview data is utilized throughout the findings to illustrate the richness of respondent reflections. Other resources, such as texts of the CWPP, other community fire plans, website information, and the March 2004, handbook on preparing these plans, "Preparing a Community Wildfire Protection Plan" (SAF 2004), were reviewed and consulted to provide additional insight on the range of fire planning objectives.

Analysis of the data occurred throughout the research process, with the most focused period in the spring of 2005 after the completion of all the interviews and entering of all interview transcripts. An iterative review of transcript data allowed major categories to emerge based on meaning and emphasis in the text. The search for competing explanations for cause-effect relationships allowed original ideas to be highlighted, and continuous review clarified those areas where uncertainties remain (Miles and Huberman 1984). The emergence and emphasis of ideas through the language of the respondents provided insight into the significance of themes (Patton 2002), and the repetition of themes by respondents and the common ordering of priorities led to determinations of the relative importance of concepts that guide presentations in the findings.

Findings

An examination of interview data identifies that participants in this research have embraced a multi-dimensional view of forest values and the risks associated with living in a fire adapted ecosystem. Commentaries from respondents concerning "values at risk" from wildfire and their more general expectations of sound forest management are typically indistinguishable, such that the other relevant issues such as natural processes, privileges of property ownership, economic feasibility, and the capacity to implement programs play influential roles in interpreting appropriate action. Thus, the primary objectives of this research – to understand the attitudes and values regarding wildfire and fuels management as reflected in the CWPP and to reveal the "values at risk" that are prioritized by CWPP actions - have been conflated in these findings (the third objective to understand special priorities for wilderness has been segregated as much as possible and reported separately). The joining of these objectives in the findings is appropriate based on the grounded, ethnographic approach of this research, which emphasizes the salience of the context as an organizing principle for data presentation.

Most importantly, these findings have unearthed complex tensions among the multiple values held by respondents. The CWPP became a vehicle for people to reconsider how they viewed significant social constructions of public and private lands and the roles and responsibilities of multiple actors affecting the management of forests and wildfires in the Bitterroot. The linkage of these value tensions emerged when respondents described their view of the resource problems in the Bitterroot and the efficacy of the CWPP to address these problems. The most insightful discoveries of this research are not that

certain individuals in the Bitterroot view the CWPP favorably or unfavorably, but that the entire issue of wildfire and hazardous fuel reduction has made residents recognize the difficult value tradeoffs that arise when organized action takes place in their midst.

To present these findings adequately, then, the descriptions below are organized around three themes that recurred across data from the 23 interviews. These themes do not ignore the "values at risk" or the "immediate threats" identified within the CWPP, but instead attempt to clarify the fulcrums and relative weights of those values that appear to be most directly conflictive. This approach respects the manner in which data came forward from respondents, since they were relatively uninterested in enumerating their reactions or preferences to a long list of values (Health and Safety, Air Quality, Endangered Species, Recreation – to simply name the first four of thirteen in the list appearing in the CWPP). Instead, the content of interviews revealed a highly sophisticated set of personal reflections on the struggles to advance multiple interests in a heterogeneous, dynamic landscape in association with complex populations of neighbors, businesses, interest groups, and government agencies.

The three themes have been labeled "tensions" to recognize the differences in perspectives on each theme. They are presented below in an order that does not necessarily identify their relative significance across the selected sample of respondents. They are organized more for coherence to a reader, to understand wildfire and fuels issues in the Bitterroot, priority areas for treatment, and the incentives and constraints affecting the implementation of remedial actions. A special section on the role of wilderness is included at the end of the findings.

Tension One: Competing values over the types of risks from wildland fire and the appropriate response

The CWPP dedicates its largest number of actions to the goal of reducing hazardous fuels stating that "Treating fuels reduces the fire risk in an area, while increasing the chance that fire protection agencies can control a fire before it gets out of hand." (CWPP p. 14). What is important to Bitterroot residents is who or what are affected by this risk, because respondents possess different cultural constructions of natural values and how they are sustained or protected from harm.

Across all respondents, there was agreement that human life is the highest priority value to be protected from harm. Within the CWPP it is also recognized in the first sentence in its first emphasis area: "Public and firefighter safety is the first priority in all wildland fire management activities." This was emphasized multiple times by respondents, in different ways, but with the same idea as illustrated by these three examples:

> We have to be able to protect people. Property is second. But people first. Houses probably second. And then other things like cell sites and radio towers, probably would be third. So life, property in that order. (I4).

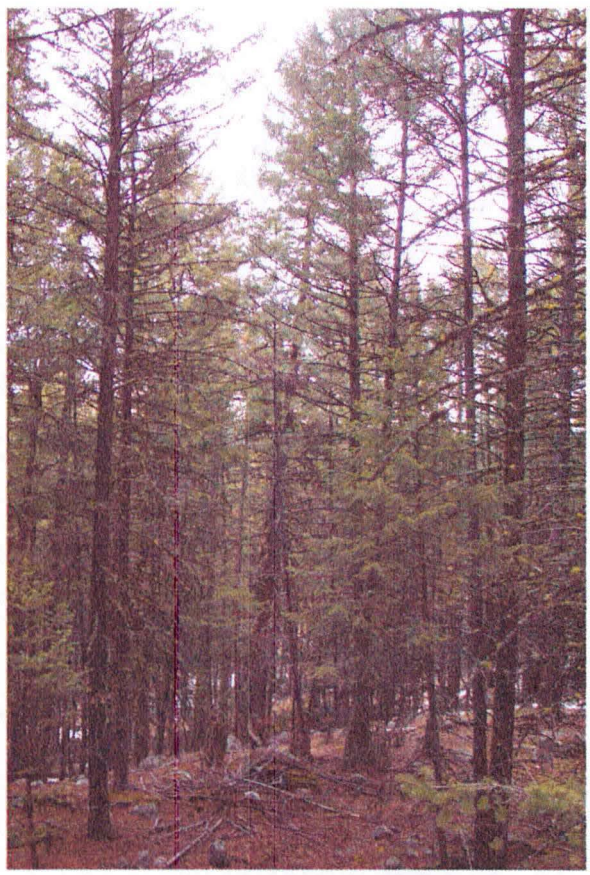
> But we're going to concentrate on areas that we've identified as high risk and we have high values. And, of course, one thing I haven't brought up is human lives. You know, that's number one. (I1)

> I don't think the property's all that important. I think life, if going to be the criteria there. (I2)

In a special category of protecting human life are considerations regarding the security of firefighters. Respondents offered multiple affirmations of the courage and professionalism of firefighters, but also acknowledged the danger inherent in this type of work in the wildland urban interface, where actions to protect homes are frequently focused at specific locations in the direct path of the fire. Homeowners are expected to be sufficiently responsible to create defensible space to contribute to firefighter protection. The following statements identify the emphasis placed on ensuring firefighters are not placed in situations of undue risk:

> The number one priority (for treatments) I believe should be inhabited homes …the benefits of that would be that that would also serve to better protect lives, being the people that live there possibly, if they're in their home, but also importantly firefighters' lives. It would give the Forest Service a lot of leeway in terms of if that work was done then they would not need to put firefighters at risk to save that home. (I3)

> And so I have some pretty strong beliefs about firefighter protection and about the responsibility of private landowners to develop something called defensible space so that in case their home or their property needs protection that it can be done with as optimal amount of fire safety, of safety for firefighters as you can get. (I12)



A respondent with fire suppression responsibilities acknowledged that sometimes people's homes are in locations that simply do not afford themselves to direct protection during a fire, since the access to the house does not provide adequate escape routes for the firefighters. In these cases, protecting the property is simply not worth the risk it presents to the fire suppression personnel:

> I've been on roads on the west side where I have driven up the road, could be two miles long to get to their house.

> Now if this was a forest fire area I won't send my crews up there. And I've been in those situations in the fires of 2000 to where homeowners living in the interface are saying, "Why aren't you putting a truck at my house to protect it?" And I said, "I will not, because a life is more important than anything you have up there" (I19).

Although there emerged, not surprisingly, a consensus view that human security is the top priority for protection from wildfire, the manner to accomplish this protection does not enjoy this level of agreement. Further, the protection of other values, such as human structures, forest investments, watershed functioning, aesthetics, and the overall health of the forest reveals tensions among respondents regarding the role of fire in ecosystems, the sufficiency of knowledge regarding hazardous fuel treatment effectiveness, suspicions of ulterior motives, and the potential for highly negative unanticipated consequences. The most basic schism among respondents regards the expansion of treatments beyond the "home ignition zone," or the area of "defensible space" that occurs in the immediate vicinity around human structures.

The CWPP addresses this schism in its first appendix, "Frequently Asked Questions," via its advocacy for healthy forests and landscapes, as well as firefighter and public safety. In the opening paragraphs of the response to Question #2 of the Frequently Asked Questions, the CWPP states, "A persistent question relates to the need to treat extensive forest areas beyond the immediate vicinity of about 120 feet adjacent to a structure. It is very important that forest county residents understand the needs for maintaining healthy forests in their neighborhood…It is easy to become fixated on the idea that the entire objective of the Fire Plan is to reduce fire losses to human structures. Focusing exclusively on protecting human structures ignores the values that a healthy forest provides to our communities and our quality of life" (p.33). Later on in this same answer to Question #2, the CWPP addresses this issue of extensive fuel reduction treatments under the heading of firefighter and pubic safety: "Without hazardous fuels treatments on lands near and within the interface, the potential intensity of wildfires create such dangerous conditions that it becomes difficult to engage in effective firefighting strategies" (p34).

With only a few exceptions people participating in this research agreed that fuel treatments throughout the wildland urban interface could improve the overall effectiveness of firefighting, but for a variety of other reasons, eight of the 23 respondents believed it to be unwise to engage in these treatments outside of the home ignition zone. This disagreement reflects not so much a difference in values toward the forest – across the entire group of interviews people articulated common desires for healthy forests, clean water, vibrant wildlife populations and opportunities to recreate in forests. Yet the disagreement highlights that people do not have a clear idea of how these values can best be manifest. For some, extensive intervention to treat hazardous fuels threatens the realization of these values, and for others, these treatments appear as a logical, necessary, and obvious response to a serious contemporary forest problem caused by a misplaced, overzealous recent history of fire suppression. The following description of how people view treatments outside the home ignition zone reveals the contours of this disagreement,

and the complexity that is perceived in attempting to direct human actions to create a healthy forest environment in the Bitterroot.

For the proponents of treating fuels across the wildland urban interface, reducing wildfire severity and containing wildfire's geographic extent emerged as powerful rationales for an active program of both mechanical thinning and prescribed fire. Although throughout the interviews and within the text of the CWPP there are admissions of "no guarantees of protection" from wildfires, these respondents believe that the active management of areas outside of defensible space would, under normal weather conditions, improve the protections for both lives and property. Because of treatments, fires would "lie down" and risk would be reduced. In addition, these treatments would create conditions that would benefit the residual forest stands, making them healthier than before. Here are some representative comments:

> We believe that hazardous fuel reduction which is carried out on a little larger scale than what we call defensible space, will over time provide the greatest benefits in terms of reducing the threat of severe damage from wildfire and it will be a little bit easier to maintain and will also help maintain forest health... Defensible space won't cut it. If we can get enough of the forest in a condition where a fire can be kept mostly on the ground, then our firefighters will have a chance to contain that fire within some kind of reasonable boundaries (I2).

> You can treat defensible space but if you don't treat the wildland along with it, you're really not reducing that risk as much as you should. Plus, I think along with that is the forest health, dealing with the forest health, along with the fire risk. And it's not, it kind of dovetails. (I1).

Concerns for forest health and the need for treatments were expressed in other, more graphic ways by other respondents. The growth in insect populations such as the Douglas fir beetle and mountain pine beetle have also had an impact on people's impressions of the condition of forests, and treatments appear to a few Bitterroot residents as an urgent responsibility:

> (The forests are) decimated, you know, falling down, disgusting, you know. I mean, if you had a herd of horses and it was on your personal property and you had 17 out of 30 that were sick, people would turn you into the government agencies to be shot. They would accuse you of animal abuse. Well, we have entrusted the Forest Service with management of the land, and through science they should be doing that. With their degrees they should be able to assess a sick forest and then take appropriate actions to give the treatment needed. As with a herd of horses, they should be able to go in there and cull the herd. They should be able to take one beetle tree out before it affects hundreds or even thousands or even millions of trees.(I20)

Other respondents believed broadly applied forest treatments would be a sign of returning management to a more holistic, ecosystem-based approach. The active reduction of hazardous fuels would provide new options for management in the future, such as the encouragement of smaller, more frequent fires in the dry pine zone so that fire would play its prior role in ecosystem function. People recognize that the forests of today in the Bitterroot are different than the forests of the past, based in large part of the active suppression of fires. The high density of small trees presents problems in moving toward healthy forest conditions. Since publicly sanctioned activities such as commercial logging and fire suppression caused the emergence of so many small trees, it is necessary for managers to make amends. Comments from three respondents reflect this view:

> The thing is, we're going through a transition period here. We got all new forests now. Ninety eight, 99% of the trees we got have been born since I have...They cut all the old stuff out, see. You got nothing left but the little new growth. And the little new growth is fire prone (I11).

> If a system is beyond, if we've eliminated some disturbance factor like fire for a long time, then that's going to have an effect. So we need to bring back fire into the scheme some way because it's always been there, at least after the ice age (I1).

> You know, the last 26 years, and it was only until about, I would say he early 90's, like '90, '91, when our fuels emphasis kind of turned from the typical burning slash after harvest activities to more of an ecosystem management approach, and taking a look at stands that have missed fire return intervals and reintroducing fires into those areas (I13).

Another reason that emerged as justification for broadly treating fuels was the utilitarian desire to make sure that forests were not wasted or lost to human use. Although only explicitly mentioned by four respondents as an important reason for treating the forest, inference that the forest has monetary value was recognized by everyone interviewed. This comment emerged from a discussion of why the forest should be treated at the landscape scale, since the scope of the hazardous fuel issue is widespread in the Bitterroot:

> It's truly wasteful, I think of our natural resources to just let the stuff burn up. You know, and so I think it's got to be thinned out...and be careful about it. Do it in an environmentally sound way. And you know, the millions and millions of dollars that we put into fighting fires, put some of that money into ecologically sound logging practices and go to it that way...it's a long term project. That's the way you've go to look at it. It's certainly, and like we were saying, there's millions of acres that have to be dealt with (I9).

The proponents of widespread treatments in the wildland urban interface would occasionally mention their belief that treatments would provide improvements in wildlife habitat, especially for popular ungulate populations like elk and deer. Six respondents mentioned the importance of fire for increasing forage opportunities for elk. The illustration provided below comes from a logger, who advocates for active treatments not on the basis of personal economic opportunities, but because he views his profession as creating conditions that vitalizes all life in the forest - the trees, the watersheds, and the wildlife.

> I'll tell you why I did what I did, what the science was behind it, why I kept each tree, why I took certain trees. Because I'm a tree hugger. I love to see good healthy trees everywhere. And when I go into a place that's not managed or is overgrown, it's unsettling to me. It's not happy. It's not a good feeling. I wouldn't want to live there. I don't think the animals necessarily want to live there, you know. If you get, during some parts of the elk season or something, I can imagine an elk going into an extremely thick patch, but if they had their druthers, they'd be out munching on good quality grass (I20).

Only one respondent out of the 23 interviews mentioned the potential for treatments to affect endangered species, and this individual believed that more aggressive, active treatments would have a positive effect on endangered species by virtue of reducing the extent of forest loss via more effective firefighting:

> That's what we're looking at doing here (with fuel reduction projects), is talk about the whole spectrum of issues and interests as what's affected by fires. So there's endangered species, reintroduction of the grizzly bear, whatever it is. That can all change if fire isn't considered in any kind of scenario like that (I23).

The importance of aesthetics emerged as a strong justification for treating fuels in the forests. Even though the desire to sustain aesthetic values across the Bitterroot Valley was supported by all residents interviewed, those that supported more active treatments were more explicit about the opportunities to enhance the visual quality of a forest setting. These individuals emphasized how fuel treatments create a pleasing forest appearance by opening views through the understory and "cleaning up" what was previously a dense, sometimes tangled forest. This view from a non-forester characterizes this point of view.

> To cut the understory and to clean off the property and cut the trees up and thin the trees and all these things that I have seen them do, it's absolutely – it makes the land look absolutely beautiful (I19).

Finally, one respondent that had recently migrated to the Bitterroot and has become enamored with the beauty of the valley summed up the importance of sustaining forest health as a general responsibility that demonstrates a care for the land. Beneficiaries of

this ongoing care, whether it's intended for treating fuels or diseased trees, would accrue to everyone, not just the residents of the Bitterroot Valley.

> You drive down the road and you look over at this beautiful forest, and there's all these ugly brown trees. And it could be prevented with just a little care by the Forest Service...You've got to take care of what you've got, because people, everybody, needs to use these places, not just the chosen few who can afford it (I22).

In turning now to the views of the eight respondents who are skeptical regarding the benefits of active fuel treatments outside of the home ignition zone, it's fascinating to note that their advocacy for a more passive approach is also based on a sentiment to care for the land. This group is concerned about overly aggressive hazardous fuel reduction for multiple reasons: a desire to sustain the naturalness of the forest, the risk of harming ecosystem processes that depend on fire, promoting effective wildlife habitat for fire-dependent species, and their view that there remains a paucity of scientific evidence to understand the consequences of these treatments. Again, these respondents do not argue that it is important to protect people's lives or their property, but they feel that this can be done exclusively with treatments in the defensive space immediately surrounding a residence. The following comment from an individual with extensive experience as a forest manager folds in several of these concerns regarding the uncertainty of treatment outcomes, and also suggests that hazardous forest treatments might even create conditions that increase the likelihood of fire:

> I think there's some research that shows there's certain things could happen or would happen or likely happen if fire comes through and burns in this area within, I don't know, a few years after a treatment has happened. But then you get beyond that, down the line in time, you know, how often do you have to do this kind of treatment? What will the wildlife response be? Will the fuels really be just dried up when the forest is thinner above and will it be more vulnerable to the flashy fire when there's just, you know, grasses or small vegetation down below that get a lot more sun? I think there's a lot of things that need to be explored. And I think that politically the treatments are getting out in front of the knowledge about really what it's going to do (I16).

A recurring rationale among three of the eight respondents opposed to widespread forest treatments is that the desire to acquire more wood products overshadows the desire for

effective risk reduction for people. This viewpoint asserts that the public's fear of fire became a new opportunity for forest managers, who possess a bias to manipulate vegetation for commercial benefit, to revitalize a timber program that had shrunken in importance over the past decade. Expanding the need for treatment beyond the home ignition zone to an ill-defined, extensive wildland urban interface creates a convenient excuse to pursue a timber harvest agenda. The following two comments highlight this view:

> What the Bitterroot Forest did was they expanded the wildland urban interface in a couple different ways. One is they expanded its length along the entire national forest private land boundary, which is illegitimate, I think, totally ignoring where dwellings, homes, inhabited dwellings occur. And also they expanded it a mile back into the forest. Well, that's just the same old timber beast manipulation of what began as what I think is a legitimate public interest, and expanded it. And the only rational reason I can think of for that is just the usual, get the cut out. That way they can access a tremendous amount of timber land and log it under the guise of home protection or fire protection or wildland urban interface. (I3)

> But quite frankly, this whole focus on fire risk prevention appears to me to be a ruse, a red herring because what we're seeing on the ground is that areas where fire prevention work, so called fuel reduction work really could be done isn't done because there isn't any timber in there to make it pay. And where there is timber in there to make it pay it's usually outside of any area where fire risk is a real problem. So there's a lot of logging being done now on this forest, on the Bitterroot National Forest and on other national forests around us here that's done in the name of fuel reduction but it doesn't have anything to do with fuel reduction from a scientific, from my point of view, which I think is a scientific point of view (I18).

A different respondent, one who did not argue that widespread fuel treatments were a veiled motivation to expand a diminished timber program, believed that aggressive fuel treatments could present greater risk than benefits to ecosystem health. Under this view, it is hubris to suggest that humans can manipulate forests with adequate foresight to restore natural conditions. Although previous fire suppression had been a misguided activity, it would be equally unwise to suspect that thinning, prescribed fire, or other treatments imposed on the land by managers could be better than letting nature take its course. This longer, rather detailed statement lays out this perspective:

> And it just kind of goes to this idea that we have to actively manage our national forests in order for them to be healthy. And I just simply don't agree with that. And that is the mantra of the Forest Service. I mean, whether that's job security for its employees or whatever, whether they truly believe that, I don't know. But that is their mantra. And to me that's

> just a slap in the face of nature or the Creator, however you want to look at it, to say that people now are in control and that we need to be in control or these places aren't going to be healthy is just, I think it's just ludicrous to say that. I'd like to see a very light-handed management on our forests. I believe that there's some things we probably should have to do. Wildland urban interface is one of those things. There's probably restoration work that needs to be done. We need to be looking at some of the effects that roads have caused, maybe even intense fires, maybe working on some of those. But, you know, as far as, what would be the word for it that they're using now? Restoring ecosystem components or restoring historic conditions. Well, nature's going to do that on its own, whether it's through fire, blow down, insect(s). All of these natural conditions have been occurring for eons. If these forests needed our active management then Columbus should have landed on this country to find a desert. Right? Because nature was in charge for how long? So if nature can't do its job correctly without us, then when Columbus landed the whole North American continent should have been devastated. I mean, I'm sorry, that's just the way I feel about it. And I'm not saying we can't do anything. But we need to be very cautious and we need to do small things. (I15)

In a similar vein, a respondent argued that the attractiveness of the Bitterroot was related to its natural authenticity. Although some people might find a thinned forest more attractive, it was important to this person that there was not an effort to create forests that were somehow made "artificial" by the ongoing hand of human interference. Like other respondents in this group, this one favored treating defensible space, but not going too far:

> And so you have to look at how far out into the, away from private structures or any structures or private land. How far are we willing or is it necessary to go out to artificialize things and still have what it is, why we live here? You know, a natural ecosystem, something we like (I16).

A separate justification, raised by most respondents in this group, is that the whole idea of thinning forests is counterproductive to the reduction of fire occurrence. All but one of the 23 respondents in this research had experienced the fires of 2000, so they had some direct observations of some of the locations and consequences of fires. Those that oppose widespread thinning treatments paid particular attention to those locations where the 2000 fires had burned, sometimes quite severely, in areas that had been previously thinned. Among six of the eight respondents skeptical of widespread thinning treatments, previous logging activity appeared to increase the potential for fire damage. To these individuals, it does not seem reasonable to initiate new management into forested areas, especially those areas that do not have an existing road system, to try to reduce wildfire risk. The following comment portrays this view:

> And what is reasonable? It's certainly not reasonable to go in there before the fire season and slick off the mountainside. That's not reasonable…just look at where the fires of 2000 burned. I mean, if logging, or what they call thinning now, is supposed to buy a lot of protection, just look at where the 2000 fires and the degree of intensity where the 2000 fires burned. Theoretically, they shouldn't have even burned…I mean, if thinning's supposed to take care of the problem, these lands should never have burned (I7).

As has been previously suggested, there is the view among this group that we simply don't know enough to go off into the forest with an aggressive thinning program and expect to get exactly what we want. This more humble view was argued in multiple ways by the group opposed to widespread fuel treatments (as evidenced in the long quote above supporting "light-handed" management). One respondent believed that thinning operations depended on the specific circumstances of the land and its social and ecological context (this view of conditionality and flexibility is actually shared by most of those who favor widespread thinning, as will be described later on). The approach advocated by this person was one of caution as reflected below:

> You would look at what vegetations are right now, density, type of vegetation, etc. What's the most hazardous fuel situation?…So I think there's certainly a basis that we could and should do it. But I think we'd want to be real sure that the actions we were trying to require through law actually worked. And I'm not sure we that we're at that point yet…I think there's so many variables involved. We're not real, it's not real clear.(I8).

Finally, one respondent that was ambivalent about the need to treat extensive areas of the Bitterroot believed that a smaller scale approach might be better. The application of projects at this scale would obviate a serious mistake. To this person, the type of treatment and its location were always subject to competing factors that guided the potential actions, and there needed to be a more compromising approach:

> So where's your fine line? You know, there's always this line of compromise on how to do it … So a lot of times I don't think you have to do massive projects. I think what you have to do is put in your fire breaks and your other stuff, and you know, I think sometimes they make the projects too large, instead of, you know, you can see it on a small piece but not on, you don't really need to do it on a large piece. (I17).

The tensions revealed above demonstrate the multiple values in play when people consider a community response to reducing the risks from wildfire. Although there is agreement among all respondents that lives and property should be protected, the uncertainties concerning both treatment effectiveness and the consequences of these treatments to other important values make choices much more sensitive than anticipated in the CWPP. A different, but powerful value tension also emerged from respondents

regarding the responsibilities of landowners to take action on there own lands, and the following section presents findings in this area.

Tension Two: Responsibility for community protection versus individual discretion on private land activity

Although the overall benefits to the community and the surrounding forest from the widespread treatment of hazardous fuels does not embrace full agreement, the actions recommended in the CWPP reflect the views of many respondents that a comprehensive fuel treatment program reduces overall risks to lives and property. However, in a landscape where public and private lands are intermixed, decision-making on the adoption of fuel treatments rests in the hands of the property owners themselves, and property owners in the Bitterroot are widely recognized as being of a highly independent sort. This raises the tension of a community's willingness to impose a set of standards for behavior on individual decision-makers– in this case, forest property owners with high fuel loads in their forest. Across the interviews, respondents recognized that Bitterroot residents strongly value individual discretion for any actions on his/her lands. Even for an issue as serious as fire protection, how can a community interfere with property rights? The following sets of responses demonstrate how people viewed this tension between community responsibility and individual opportunity.

The resident population in the Bitterroot occupies an extensive, forested area, with a rather haphazard pattern of private ownership blocks based on a history of real estate sales. The recent expansion of population growth has pushed people further and further into the forest, some of whom seek isolation, as described by this long term resident:

> That interface zone, it is an area we've got up there that, you know, 25 years ago nobody wanted to live there anyway…We still kind of scratch our heads and go, "Why the hell would anybody want to live there?" You know, and so it's something that's just kind of come and popped up in about the last 20 years. So a lot of places where, you know, people want their, they want their remoteness and they want to be isolated. (I9)

This desire for privacy, one's "own piece of Montana," makes it highly problematic for planners and county officials to exert regulatory influence on landowners. The ability to make community-level change in the Bitterroot on a wide spectrum of public issues – transportation, open space, housing density - often stops at the private property boundary. This deference to individual opportunity is typically framed as "respect" for private property. As these two respondents identify, resistance to mandated behaviors among landowners runs deep:

> Private folks don't like being told what to do. And they don't especially in rural Montana, it's, you know, they are very independent. And so on private land the county commissioners don't mean anything to them. The state forester doesn't mean anything to them…They're not interested in government so much and they're not interested in being told what to do with their property. And so beyond an educational sort of thing it's going to be hard for government agencies of any kind to start getting things done on private ground. (I21).

> I don't think that people would be arguing so much about the defensible space as they would be arguing about the fact that they did not want any kind of regulations, period…, I think most people don't have a problem with the fact that you need to have a defensible area. It's that they don't like to be told that they have to actually go ahead and do it, especially in the Bitterroot. They're real strong that way. You know, if you put it out as a voluntary program you seem to get a little bit better cooperation, and that's kind of what I, you know, this is how this is going to start is as a voluntary program. (I17)

Coupled with a general resistance to being told what to do, respondents recognized that there are many individuals in the Bitterroot that prefer the forest to be thick with trees. Although this high-density forest presents the potential for fire behavior of such intensity that fires would be hard to suppress, many people desire to keep their forest in this condition. The following observations express this, with the final quote from a timber operator colorfully expressing the risks these landowners face:

> And a lot of people are like that. They have a certain idea on what their stand should look like and that's what they're going to keep, whether it's part of it or all of it. Most of them will do work around their house to protect that house and thin out and maybe totally take out all the trees. But the rest of the property, they are going to keep it as thick as they can, from what I've seen. (I23).

> We've got one gal who owns 69 acres and worked for the Forest Service. Will not take down a tree. (I6)

> But once you go to the ground and you have this lady from Australia or this woman from New York or somebody who's lived here for her whole life, I don't want the trees cut because I don't want to look over and see my neighbor's shit. Okay, so they're using it as a place to hide, a blind, looking outside of it…Everybody wants to be in this thick place and then stick their head out like a groundhog or a Columbia ground squirrel to look around. Well, somebody's got to come to grips with, you're setting in this ten million BTUs, and this is a serious thing. (I10)

According to many respondents, cooperative compliance among landowners for fuel reduction affects the effectiveness of treatments on the landscape scale. Those who advocate for the widespread treatments wish to see fuel reduction occur in groupings of property of sufficient size to make sure a large fire front doesn't simply find fuels by skirting around treated areas into denser, untreated forest stands. One respondent summed up the dilemma of attempting to generate comprehensive treatments in this complex mix of ownerships:

> I've seen people who have gone out and cleaned up their property, spent the time and the money and the energy to get it done, knowing that neighbors on three sides haven't done anything, and knowing that if something blows through it's going to go right through their property because they haven't done what was right. Then you get into personal property issues. I have a right to do what I want with my property and I choose not to do that. Boy, it's tough. But we all have to live in this community and that's where you've got to take what's best for everybody as a whole, not just one person's selfish thoughts either way…Putting on regulations, government regulations against personal property rights is a tough, tough issue. (I19).

Even though nearly all respondents recognized that the regulation of private behaviors is difficult, nine of the 23 respondents believed that this issue of personal responsibility toward fire protection is serious enough to warrant regulatory pressure. Although these nine did not share all the same rationale for imposing regulations, their positions recognized both issues of public costs and public safety. Regarding the issue of public expenses for providing protection for property, these respondents all felt that it was the landowner responsibility to bear a major portion of these costs. In addition, these respondents identified that landowner responsibility is something that new residents of the Bitterroot should accept as part of the terms for living in the valley's fire adapted ecosystem without expecting agencies or others to bail them our. The following statements illustrate:

> On the other side of this is a personal note. We both feel this - that we chose to live here, so it's our responsibility. It's not the Forest Service and

> it's not the county and it's not the volunteer fire department that is responsible for protecting our butts. (I6)

> But that to me gets back to personal responsibility. I mean, either people take the, I would love to see a system where if they don't want to do anything and they're offered this and perhaps they're not doing it through lack of resources, but if they have the resources then they should be able to sign a form that says I decline. And then if their house burns down it's there own problem. They can't sue anybody. (I14)

A respondent who supported the treatment of defensible space but opposed widespread fuel treatments in the wildland urban interface repeatedly commented that it would not be reasonable to force treatments onto National Forests at public expense to provide additional protection for people who refused to take actions on their own properties. This linkage between personal responsibility and appropriate action emphasized that it would be illogical to expend public funds for actions on interface lands when more effective protections occurred adjacent to a landowner's house:

> And it's time that people who choose to live out in those places stand up and take responsibility for what they, for their actions. I guess I'd, I would say that there should be, well, I would guess, there certainly should be rules within the rural fire districts as to the types of structures, the roofs, how much clearing has to be done within 200 feet of the house. It should be certainly more than voluntary. And as long as there are no rules then it would seem to me that why should we, the public, foot the bill to protect their property?... I don't think it's reasonable to go up there and slick whole mountainsides off to protect people who refuse to step up and take any responsibility and to protect county commissioners that refuse to stand up and take responsibility and refuse to be accountable. (I7)

An original observation that did not appear in the other interviews identified a different weakness in regulatory approaches, in that there was little capacity or political will to enforce regulations. Using the example of weed ordinances that currently require landowners to control invasive species that can easily spread to neighbors' land, this observer recognized the practical barriers of any regulatory strategy to reduce hazardous fuels:

> They say it's in the same category as weed laws, where obviously, what one person does or doesn't do with weeds affects their neighbor. So I mean, there's a basis there. I can't say the weed laws are well enforced, either. So, and we probably would never enforce fuel treatment rules, even if we had them, but you're right, there's a great reluctance, both to establish the rule and then probably even a greater reluctance to try to enforce the rule (I8).

A suggestion made by several respondents to address the responsibility/private property dilemma was to provide incentives to landowners. These incentives could take several forms – tax reductions, insurance rate reductions, or cost share opportunities such as the ones that had come to fruition through the creation of the CWPP. Fourteen of the 23 respondents mentioned the use of insurance rates as a means to catch people's attention (even though higher insurance rates would be categorized as a disincentive, most called this an incentive). Some had a more strict attitude than others about insurance requirements, and several had heard about how State Farm Insurance of Montana had contacted their clients to inform them of changes in homeowner policies for those that did not create defensible space around their residences. These comments are reflective of people's ideas on encouraging incentives:

> I do think that there ought to be some sort of incentive. And I've always told people I think it should be done through the insurance companies. That if the insurance companies, the individual adjusters can come out and look at it they can make the determination and they can say, well, if you want a policy in place you've got to clean it up. If you don't want insurance then it doesn't matter (I21)

> I believe it's probably just encouragement at this point is all that public land managers can do, is to educate people, encourage them. You can lead a horse to water but you can't make them drink. And in this case you can't make them reduce the fuels on their private property. But the insurance companies sure might. And I think recently there's been some talk from State Farm, I believe it is, that's talking about canceling insurance policies or making those insurance policies very expensive for people who don't do the right thing while living in the wildland urban interface. And I think that's a good step to encourage, you know, private homeowners to do the right thing. If they're not going to do it for their own safety or for, they'll do it because their insurance is going to go up. They'll do it for money. So I think that that probably is going to be the most effective tool for those people who resist doing the work. And I think that the public should just keep encouraging and having the opportunities put forth so that when they are ready, you know, they're ready to do that work. With, like, Frenchtown Rural Firefighters have a great program where homeowners only have to pay $100 to have crews come in and thin their forest around their home. (I15)

Finally, a long-term resident with diverse experience in both firefighting and forest management advocated for a multi-method approach to address the problem of fuels on private lands:

> To have a successful community effort, fire protection effort requires incentives, disincentives and regulation. There will be people that will voluntarily comply. There will be people that will comply with financing support. There will be people that will comply reluctantly with

> disincentives such as insurance and so forth. And then there will be people that the only way you'll get them to comply is to make them comply with regulation. But you need all those tools in place and operational to be successful (I12).

Tensions in project implementation

Although not in the same category as the public tensions over the best means to protect lives and property, sustaining natural forest character, or protecting private property interests, the implementation of the CWPP recommendations raises other dilemmas. When well-intended projects hit the ground, other types of values, such as economic profitability, timeliness, adaptability, the fulfillment of expectations, or the maintenance of existing institutions become relevant. A primary outcome of the completion of the CWPP was the opportunity for the Bitterroot Resource Conservation and Development Area (RC&D) to compete successfully for financial resources to apply fuel treatments on private lands in the Bitterroot Valley. The acquisition of these funds greatly expanded the hazardous fuel reduction activities as prescribed by the CWPP (as well as other actions in the plan), but via this implementation, other constraints and necessary choices became apparent. This section of the findings will illustrate the most commonly mentioned issues and concerns that respondents believed would come about during the implementation of CWPP recommendations.

The first tension relates to economic feasibility of recommended actions. Those respondents familiar with the Bitterroot RC&D's landowner assistance program, which utilizes funds from the Western States Grant from the National Fire Plan, recognized that the grant was instrumental in getting work done. Even though this grant requires cost matching provided by landowners, it has been an instrumental motivator to get projects started. The economic value of the harvested resources themselves could not pay for the treatments, which cost between $500 and $1000 per acre. One of the timber operators that works on these projects explains how this affects a landowner:

> There's almost never profit in the wood to do (it). So where the grant program, it helps them out. It reduces the liability for them, the financial liability…Like this particular job. We're going to get some from the logs, but he's also paying some per acre to clean it up, and then he's going to be reimbursed some per acre from the fuels program. So it, you know, and the end result, we should be able to make a profit on this, but not from what we're cutting. There's no way. (I21)

Having the grant program allows timber operators to do the necessary fuel reduction work for landowners, but the resources to cover the costs (and any profits for the operator), come from external, government sources under the National Fire Plan. Of course, the major risk is not that the work can't physically be done, it's that the grant will run out. It is a fixed amount, with no guarantee of renewal. This tenuous financial situation is a primary concern of those that helped create the CWPP, and when asked

during an interview of the things that would get in the way of implementing the plan, one of the key CWPP advocates simply said, "Lack of money."

This uncertainty of funding raises the specter among some respondents that the momentum to manage forests actively for hazardous fuel reduction will push for the harvest of large trees, which are highly valued by many residents, and especially important to four of the respondents that believe that big trees will be sacrificed to pay for treatments. Here are two representative comments:

> My prediction is that Congress will not fund the Forest Service adequately to do what is talked about in theory in terms of reducing fuels in the forest. And there's this idea there that we can somehow pay for it by simply logging enough trees. ...the Forest, if it's given an objective, it's going to do its best to try to meet that objective. And in order to make the projects economically viable, if you have to make them pay their own way out of the woods, you have to go after the biggest trees and the best trees to generate the money to offset logging the crap trees that won't pay their way out of the woods (I8).

> But unfortunately, under the current system, and sometimes under stewardship contracting, they have to cut these larger, more commercially viable trees in order to make enough receipts to then pool that money back around and use it for the good stuff. So in a sense it's like robbing Peter to pay Paul. We want to pay Paul. We don't want to rob Peter. (I15)

The economic attributes of a treatment also interact with other physical limitations or other consequences that may arise when cost-effective equipment or treatment techniques are confronted with specific resource conditions. Just to present an example, one of the timber operators interviewed identified the problem with logging equipment potentially creating exposed soil conditions that would invite the expansion of noxious weeds. He brings up the limitation of machinery to operate on steep slopes (expressed in percent slope), yet recognizes that an alternative technique, helicopter logging, is excessively costly for the low value of the products removed. All of the timber operators and foresters interviewed acknowledged that every operation deals with economic and environmental tradeoffs. The comment below simply illustrates this complexity:

> The other thing is the weed issues. I think that's one of the things that would help this overall project, and many landowners are worried about weeds. In order to get this steeper ground down on the urban interface you have to disturb the soil unless you helicopter log it. And if you helicopter log it there went all your money. I mean, there's no, the cost is so intense for taking those small diameter trees, you'd have to come up with way more than what they're coming up with... The weed problem is a real issue for people. They want me to all do it in the winter. Well, automatically there goes anything over 15% because the ground freezes up

> and you can't get a machine on steep ground in the winter. So you're going to have soil disturbance no matter how hard you try not to. With technology now you can do a way better job than you ever used to be able to. Grapple skidders lift the trees. The limbs drag. You know, but they still create disturbance no matter how hard you try…even January's not a guarantee anymore. With the warm winters we've been having there's no guarantee. People are like, oh, I want a foot and a half of snow on my, when was the last time you had a foot and a half of snow in the Bitterroot urban interface down close? (I20)

Related to the economic and operational tensions facing fuel treatments are the establishment and maintenance of sufficient technical capacity and infrastructure to carry out necessary work. Commercial operators need a place to market the products that are removed from a site, and the traditional wood processing facilities in the Bitterroot have all closed. The following two respondents described the matter succinctly:

> That's the problem, finding the market for the nonmerchantable stuff is not easy. (I4)

> And then, of course, we've got to have a mill. You know, it's like, we cut the trees. Then, well, where do you take them? (I6)

Additionally, having commercial operators that have certifiable capabilities to do this highly sensitive fuel reduction work – meeting the individual demands of each landowner – requires that there are sufficient, long-term prospects for treatments to pay the significant investment costs for equipment and personnel. One respondent had taken the effort to find how many people were qualified, in terms of bonding, insurance, and other safety requirements, to carry out the work recommended by the CWPP, and the number of operators is surprisingly small:

> We maintained a list of contractors and the list grew to about 35. And then this spring I kind of got to thinking about things. You know, we're hanging out here. I sent a letter to all the contractors, ask them for their business license, their proof of liability insurance, the their OWCP proof for exemption. Our list is now seven.

Infrastructure to treat forests and maintain stand conditions for low fire hazard also implies an ability to sustain access to the treated sites. However, many roads in the Bitterroot do not meet necessary standards for vehicles such as fire engines or trucks that support suppression efforts. Other roads have a series of easements which may or may not be clearly defined. If one of the major benefits of fuel treatments in the wildland urban interface is to increase the capabilities of firefighters to suppress a fire, then the potential for access becomes critical. Road upgrades or maintenance are quite costly, and if financial resources limit treatment capacity on the land, then these limitations will also affect potential upgrades of roads. Thus, access problems cannot be ignored when considering fuel treatments as part of an overall package to improve suppression

effectiveness. In addition, road access problems create problems for the effectiveness of the treatments themselves, and new road developments or improvements to complete treatments can affect other resource values. The following two comments identify different aspects of the road situation:

> A lot of these places that have been put in there and the subdivisions that were done were done before there was any kind of county planning or anything, and so the access into those areas is very poor. And, you know, if you only have one way in and one way out, regardless if it's been treated or not, if things get to burning hard, that's going to be an area that you're going to be very cautious about. (I13)

> Like right here, there's hauling out this road. There's like 17 different landowners who are all concerned and had to take pieces of my time, which cut down on my production. And that's one of the biggest problems you run into in the urban interface doing projects like mine...Okay, now without easements through each individual piece you either have to build new crossings on streams, which this would have been the case, which I didn't want to do because then it would have caused a 310 permit to happen. You'd a had the environmental impact assessments. You'd a had to put a culvert in here which would have been detrimental to the fish habitat. And there's a million reasons why you should use existing roads, and lots of reasons why you shouldn't. (I20)

An additional issue facing implementation is generating the necessary communication and encouragement to expand the extent of treatments to keep up sufficient public awareness of wildfire risk. Even just a few years after a major disaster event, in this case the Bitterroot fires of 2000, people's interest and motivation to prevent negative consequences from future events dissipates (Drabeck 1986). The diminishment of the salience of fire events, coupled with new people moving into the area over the past five years, implies an ongoing and costly educational effort to sustain public interest in wildfire risk reduction. These comments highlight this condition:

> And it's amazing how many people you encounter that are living in that environment that don't have a clue what kind of danger they're in. So education plays a huge role in this, just to make people aware of what they're living in...And so you're dealing with a lot of naïve people that have no experience with fire, other that what they read in the newspaper or see on television, and they have the basic teenage attitude is it's not going to happen to me. And so it's a huge challenge to educate. There are about a hundred people a month are moving into this valley. (I12)

> You don't have a couple of forest fires for three years and they think they're done forever. Yeah, whatever we did solved the problem. They will forget these management programs. Forest management programs will be harder and harder to fund because the local people are not yelling

> at the constituencies in Helena and Washington or wherever. So yeah. They forget real quick. (I19)

> The interest in landowners who really wanted to do something peaked in the spring of 2002 or 2003. We did a bunch of private landowner seminars, and we said we have grant money to help you and nobody showed. I mean, it was just like it's off the radar screen. (I5)

In a contrasting view, one respondent commented that it has been recurring fires, not only the fires of 2000, but other fires in 2002 and the media attention devoted to other fires in the West in 2003, that might be having a positive effect on people's awareness:

> And frankly, the types of fire seasons we've had here recently, people are learning…I think the repetition of the fire, the large event that was occurring and the amount of evacuations that had to happen. So education, I think, is a really big deal. Back to the living in a fire environment (I1)

Other disaster research also supports the importance of recurrence in building public awareness, especially if the disasters tend toward seasonal periodicity and sufficient frequency to provide ongoing personal experience (Drabeck 1986). Yet this awareness isn't necessarily leading people to adopt fuel treatment practices across the Bitterroot Valley. Even with an advertising campaign to announce the availability of funds to help landowners treat their defensible space as part of the grant through the Bitterroot RC&D, the same respondent from the quote above identifies his disappointment with the scope of participation in the fuel reduction program:

> Just like this application process. We advertised it. I don't know how better we can do to advertise it. Take out a one-page ad in the paper and put it there every day for 30 days? But I was very disappointed that we didn't get more down in the East Fork, and the West Fork, up in Florence. Everything's congregated west of Hamilton and Victor. (I1)

In the face of these challenges to sustain public engagement on the fire issue, many respondents believed the adoption of fuel projects depended on the accrual of visible treatments on a growing number of neighbors' lands. This observability of an new type of land management practice and the influence of peer networks to demonstrate acceptability have been identified as fundamental principles in the diffusion of innovations (Rogers 1983). Several comments recognized how this ball already seems to be rolling as a result of the projects emerging from the CWPP:

> If you plan a fuels reduction project in their backyard, something that is near and deal to them, they show interest. But, you know, if it's something that they're not exposed to on a daily basis, there doesn't seem to be a whole lot of interest. (I13)

> And so suddenly there's a neighbor, there's a landowner in several different neighborhoods who can demonstrate that the treatment looks pretty cool. It opens it up so you can see more wildlife, see more wildflowers but it's not a clear-cut or anything.... It's the ripple effect where you're going to treat one landowner here and then pretty soon the landowners over here want to and then over here they want to and this guy is never going to. And so that's okay. But, so you, it's not a symmetrical ripple, but we definitely noticed it. And the landowners in some cases want help and they want assistance and in other places they say, you know, let me know when your contractor's done at your place. I'm going to hire him to do mine. (I5)

Following this view, a major success of the CWPP has been its ability to harness the awareness of early adopters, acquire money, and get something done that people can see and chose to implement on their own land. Although it's still far too early to tell the long-term effectiveness of the CWPP, this focus on action might be able to make progress against the inevitable headwinds of public apathy and the general aversion to risk-reducing efforts or expenses. A majority of respondents praised the action-orientation of the CWPP, the determination of leaders within the Bitterroot RC&D (which acquired the grant money), and the follow-through that accomplished approximately 700 acres of treatment on private lands over an 18-month period. The many forest-level planning activities in the Bitterroot since the 2000 fires had generated a degree of public frustration with forest management decision-makers, because other plans spawned multiple public meetings and detailed assessments with very little accomplishment on the ground. As the following two comments emphasize, the CWPP presented a refreshing change in forest planning in the Bitterroot. Its focus on private landowners allowed rapid implementation, and to many it provided proof-positive that treatments could be aesthetically pleasing as well as potentially effective in diminishing fire severity:

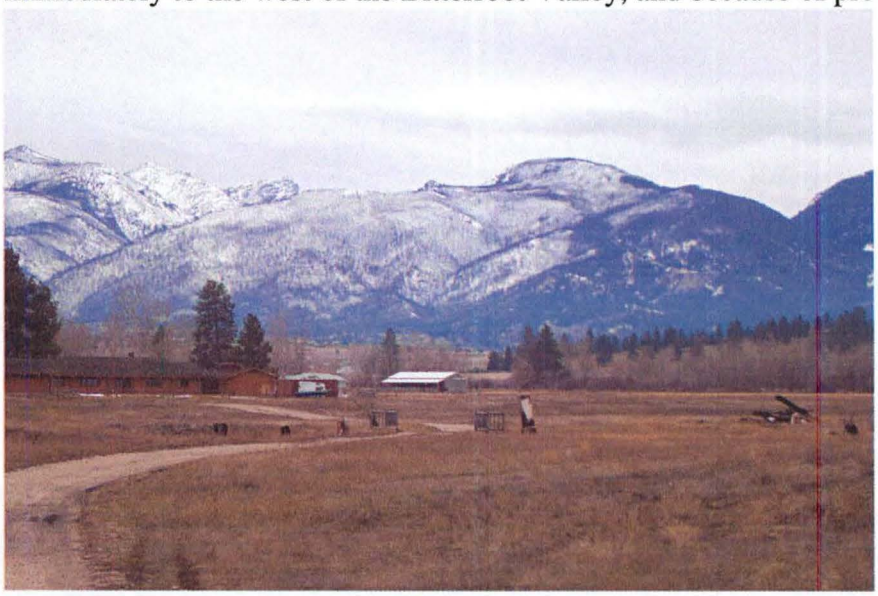
> I think getting good examples on the ground is probably the best thing. I mean, we can talk and we can talk and we can talk and talk and talk. But when people finally see it, and it's going to take some time because here we're going to have a 95 acre block that's all together with three different landowners and maybe 15 years, 20 years down the road, if there's a fire event here we'll be able to see how this specific treatment affected these homes and these private properties. But in the meantime, to try to get more people on board is we've got to get work on the ground. And we got to stop having bad work done on the ground. (I21)

> If we show people that, yeah, we are working in the urban interface and we can make a difference through one small step at a time. So I think we'll continue, but how fast we continue depends on both the number of grants we get and how well we do what we said we were going to do...And no one knew, really. They were afraid that it was planning for

planning sake. And until you get something on the ground it's tough to keep people's interest. (I4)

Effects of the CWPP on Wilderness

A special interest in this research was to understand how the actions proposed in the CWPP would affect wilderness areas. The Selway-Bitterroot Wilderness rests immediately to the west of the Bitterroot Valley, and because of prevailing winds, natural fire starts that occur from lightening in the wilderness may move eastward down canyon valleys into inhabited areas. Respondents were asked how CWPP recommendations might affect wilderness, and a diversity of responses emerged. One of the respondents highly familiar with fire behavior acknowledged that the proximity of the Selway-Bitterroot Wilderness to residents requires managers to be quite cautious, since unpredictable high winds can drive a fire down the valley quite rapidly. As is described below, even a lightening strike onto one tree might be sufficient to trigger a much wider, more dangerous fire:



> Our ability to manage wildland fire in wilderness, particularly along the Bitterroot front here is difficult due to the proximity of other ownership to the mouths of a lot of these canyons and the fact that the topography does not change once you hit the wilderness boundary. And issues associated with allowing fire to burn back there under a significant wind event, and we have historical events that could prove that a single point ignition on a snag rock point, which is inaccessible by firefighters, allowed to burn for a period of time, (the) snag falls down, sets up in front of a wind event which is typically out the west and within eight hours the fire is visiting the back door of a community. That's occurred on a couple different occasions over the last 20 years. Certainly, it makes it more difficult for us to implement and manage a wildland fire use program on the Bitterroot front. We do, however, are very proactive in managing that program on the southern end of the forest where other ownership or proximity to the urban interfaces is located such that it's not a threat and in the event we do even get a wind event or two on a single point ignition. (I13)

Even with these risks, nearly half of respondents, eleven out of 23, mentioned that the CWPP provides additional opportunities for the wilderness to be managed in a more natural manner, allowing "use" fires to take their customary role in shaping ecosystem conditions. The reasoning for the plan supporting wilderness is that by reducing fuels in the wildland urban interface, fires within wilderness will have a lower probability of spreading through the interface if they happen to move outside of wilderness boundaries. These respondents felt that prescribed natural fires (or "use" fires) had been managed well by the wilderness managers of the Bitterroot area over the last 30 years, and that this has also been beneficial to wilderness characteristics. Two of these comments follow:

> A fire starting near the boundary here in this wilderness better have either, it either will have to be suppressed or the urban interface will have been treated so that wilderness fire can play its role within the boundaries...The best way to do that in this case is to make sure that that area between the wilderness boundary and the private land boundary has been treated to the point where you don't have that fire creating a problem. (I12)

> If we treat more and more ground in the private sector here, in the National Forest more projects, and treat ground near those private pieces, especially on the west side, my hope is that more fire would be allowed in the wilderness. (I1)

Five of the respondents felt that the CWPP would have no effect on wilderness management. These may have felt that the plan simply did not have any jurisdiction over the wilderness, and thus was not relevant. After asked if the plan was complicated by the proximity of wilderness, one respondent remarked:

> As far as the plan is concerned, the answer is no. The fact that we live in the middle of the forest is just plain a fact of life. The area is so vast, wilderness or not, that there's no way that we can treat all of it within the time frames and the dollar resources we have. So the best we can do is try and work in the interfaces and provide some measure of manageability around the developments (I2)

A different respondent reflected the view of several others, that the attention of action should be directed outside of wilderness, especially since the management of fire in the Selway-Bitterroot Wilderness area has been carried out well:

> In the wilderness I favor letting fire play as natural a role as possible. And the Bitterroot's been pretty successful in that. And there's been a lot of burns over the years. In fact, many of those burns have probably really contributed to fires not spreading as much as they otherwise might have...Outside of wilderness, that's where I think we should focus our efforts if we're going to do any fuel management. It should be outside.

> I'm not opposed to deliberately setting a manmade fire in the wilderness if it's considered necessary for fuel reduction. But I think we have so much stuff we can do outside that I don't see that that would be a high priority right now, to actually go in and try to manage in wilderness. (I8)

There appeared to be no disagreement among Bitterroot residents that wilderness character needs to be maintained. Fire's role there seems to be an important part of this natural character, and the impact of the CWPP actions might indirectly allow this role of natural fire to be more easily sustained. However, the primary interest of the CWPP is not to affect wilderness, but to provide additional guidance to the management of fire within the inhabited zone of the Bitterroot Valley.

Discussion

As would be expected, Bitterroot residents consider lives and property as the most important values at risk from wildfire. Actions recommended by the CWPP to advance the adoption of clean-up operations in the "home ignition zone" appear to be universally supported, since there is little debate that careless placements of woodpiles or flammable roofs can greatly increase the potential for a home to catch fire. The CWPP is praised for its ability to acquire substantial external finances and foment actions that can be applied to this home ignition zone, thus protecting the highest priority values.

Once treatment options leave the home ignition zone, however, agreement crumbles among Bitterroot residents on the objectives of treatments and the manner in which they are carried out. Uncertainty on the efficacy of hazardous fuel reduction treatments in the wildland urban interface revolve around several poles – the effectiveness in reducing risk, the promotion of forest conditions that are healthier and/or more aligned with natural processes, the creation of unintended consequences, and the ability to sustain economic and public support for both initial and ongoing treatments. For advocates of widespread fuel treatments, the action-orientation of the CWPP allows a demonstration of multiple benefits, including improvements in the appearance of forests and the capture of a valuable commercial resource, timber, before a predictable loss to either pathogens or fire. To this group, the consequences of inaction are severe and represent an abrogation of public responsibility. Since untreated areas are unnaturally dense with young trees from years of misguided fire suppression, future fires will be unstoppable conflagrations that place life and property in clear danger. Extensive, well-coordinated treatments will provide the dual benefit of allowing fire to play its more natural role in dry pine ecosystems while providing the assurance that if fires do occur, they will be of an intensity low enough to allow for effective suppression.

This research reveals that the schism of public views over appropriate fuel reduction treatments may hinge on contrasting interpretations of "natural." The first, more traditional view, is that natural implies an absence of human activity across the landscape (Katz 1991). Allowing nature to take its course provides the surest, most consistent

method for ecosystems and processes to recover from any abuses that might have been foisted on the landscape by prior human activity. The second interpretation of natural is an interventionist approach that attempts to advance toward natural conditions and processes through conscious action to rectify mistakes of prior management that have only been recently discovered (McQuillan 1993). Since current conditions are so far from natural, the lack of intervention will not allow a trajectory toward natural to occur. A common disturbance process, such as fire, cannot play its typical role under this perspective, because it will cause such intense, far reaching impacts that the ecosystem will veer into a tailspin of unnaturalness for a significant time period.

These contrasting interpretations collide when people consider how to deal with forest conditions in the Bitterroot. High tree densities in combination with drought have increased forest vulnerabilities to insect infestations and have created a situation where fires are not easily controllable by suppression efforts. From the non-intervention point of view, this situation is self-regulating. Fires will burn and eventually, healthy, well-adapted forests will return. This is a low cost, "natural" solution. From the interventionist, "active management" perspective, this approach is unworkable for two major reasons. First, "natural" conditions cannot return (at least in a tolerable time frame) when the consequences of a natural event like fire are unnaturally severe. Vital ecosystem conditions such as watershed function will be dramatically altered; newly introduced, "unnatural" invasive weed species will take over, and soil productivity will diminish based on either post fire erosion or organic matter consumption during the excessively hot, unnatural fires. Second, allowing fires to burn when a human population has so thoroughly invaded the forest environment is socially and politically infeasible. There is a social contract to ensure that forest fires do not harm citizens, and allowing forests, especially on public lands, to remain in a condition that permits high severity fires is irresponsible stewardship.

There are serious barriers to resolving the selection of the best approach. Uncertainty abides at all levels, including fire's occurrence, its behavior, and its consequences. Most researchers recognize that we need to know much more regarding the long-term impacts from high intensity fires. Whether of not large scale, high intensity fires will send forests into a downward spiral or disfunction is unclear.

Several respondents recognized the interplay between the need to intervene in high density, fire prone stands and the financial practicality of treatments. Comments about the lack of money to address hazardous fuel build-ups came from several respondents with extensive experience in forest operations, but there wasn't a good solution presented to address this financial shortfall (although respondents across the board expected there to be disincentive packages – like insurance requirements – that would force this payment on the household ignition zone on private landowners). Additionally, there were suspicions very close to the surface among some respondents that either lacked trust in the Forest Service or possessed specialized knowledge of traditional timber sale procedures in the Forest Service, that fuel reduction needs might create sale "packages" that combined large, economically attractive trees with smaller, non-marketable trees to

attract timber operators who must bid with an expectation to make at least a modest profit.

The fact the fuels treatments are an ongoing practice further extends the financial liability of embarking on a hazardous fuel reduction program. One landowner described, in an almost frustrated fashion, how the obligations just keep on coming:

> The thing of it is, is as a homeowner there is no way that you will ever stay ahead of it. It grows four times faster than you can take it out. Not necessarily the trees but the undergrowth, the understory. And then, of course, you learn other things. Now they say you want your crowns 15 feet apart and you want to open the canopy. You open the canopy then you open your canopy for weeds. Oh, then you've got to treat weeds. So I can hardly wait for the axe fall to tell me what the next thing is that's going to happen now that you've done this. So, you know, it's a never-ending scenario. (I6)

This economic conundrum and need for continuing vigilance were recognized in other interviews. Not one respondent brought other evidence or even an opinion that refuted this perspective. The potential for wholesale application of fuel reduction treatments and the necessary monitoring of treatment effectiveness might eventually boil down to the availability of finances.

Respondents that advocated for environmental protection as a dominant value were concerned about fuel treatments being artificial, and their application on the landscape threatens a complex condition of "naturalness" which they strongly valued. From this point of view, it would be legitimate to perform treatments surrounding other artificial infrastructure – homes, roads, even Forest Service administered cabins on public lands – but the creeping spread of human developments into natural areas and the treatments necessary to protect them from fire is viewed as a threat to naturalness. This expansion of human impact is believed to lead to negative consequences in terms of ecosystem function and renewal.

Reducing residents' exposure to risk from wildfires presents some significant challenges to managers, elected officials, and community leaders, since there are strong disincentives to engage in risk reducing behaviors. First, wildfires are infrequent events, especially if considered in the context of a highly site-specific location like a person's dwelling. People recognize that the probability of a wildfire advancing to their own property in any given year is low, so there is little pressure for them to take immediate action. It's always easy to put off this extra work. Second, the cost to making effective wildfire risk mitigation – the creation of "defensible space" or "Firewise" treatments – is quite high. Anyone who has cleared brush for an afternoon can easily find an alternative activity that is far more desirable. If a contractor is hired to remove the woody material, the aforementioned economic constrains come into play, especially if special tree feeling or clearing equipment is necessary. Evidence from this study demonstrates that the value

of the material removed frequently does not cover the cost. Third, wildfire risk reducing activities in the forest or zone surrounding a residence can be ineffective. There are wind-driven fire events with such enormous heat energy that typical Firewise treatments can be overwhelmed by large-sized, airborne burning brands and a residence or forest area will still burn. People living in the Bitterroot in 2000 observed how fires were able to burn through previously treated areas. Finally, there are competing reasons from the point of view of privacy, aesthetics, or preferred wildlife habitat that will argue for high densities of trees surrounding an individual's residence, such that a person makes a conscious choice to live with the risk because of preferences for an existing condition of high fuel loads.

Providers of fuel reduction treatments around households observe that many owners must be coaxed into removing their favorite trees or shrubs around their houses, and they acknowledge that each fuel reduction treatment in the home protection zone requires careful negotiation with the homeowner. The evidence in the findings of this study confirms these homeowner sensitivities. Here's a statement from a respondent that reinforces the personal nature of forest treatments on a homeowner's property:

> You need to do a lot of handholding and a lot of talking and a lot of walking around their property and a lot of flagging of trees and a lot of explaining what fire behavior-wise what's happening, could happen, insect and disease-wise, what is happening or could happen, and all that kind of stuff...you know, if they want to leave a screen so they can't see their neighbor, okay. As long as it doesn't compromise the overall project, we can do those kind of things. If they have a favorite tree, it's an ugly tree, but they like it, okay, I don't care. So you can leave a tree. But you've got to take out this and this one. So I really, it's really, I don't know what the best word is, but you really concentrate and really pay attention to the landowner and what they want...When I first walk up to the door, I'm going, okay, I wonder what I'm going to get myself into. I've been cussed at. I've been kicked off land. I've been welcomed with open arms. (I1)

The CWPP also brings to the surface the practical limitations of government sponsored action in a rural environment with fierce devotion to private property interests. The ability of government authorities to mandate fuel reduction treatments on private land in the Bitterroot seems limited, at best. Bosselman's (1984) recognition of the tension between land ethics of responsibility and opportunity could not be more starkly evident. Residents of the Bitterroot Valley have expressed in multiple ways their resistance to government interference over private property interests, and the reluctance of the majority of respondents in this research to advocate for regulatory approaches to fuel reduction demonstrates this shared experience. The tension between the individual and the collective is as old as politics itself, and in its manifestation on land use policies in the west, Montanans pride themselves in an adherence to the opportunity ethic. This is not necessarily the case in all communities in the western United States. For example, Prescott, Arizona adopted new conduction codes in 2001 under the Prescott Vegetation

Management Program. All new construction in Prescott within high hazard zones requires a fire protection plan approved by the local fire chief, and the zone around the house must demonstrate defensible space treatments prior to occupancy. Something as strict as this requirement does not seem to be on the immediate political agenda of local government bodies in the Bitterroot, but other types of disincentives, including insurance premium changes, may be on the horizon. Under the right conditions and political leadership, it may be possible to advance a creative package of incentives and disincentives regarding community responsibility toward fuel management, as advocated by one of the respondents in this research. Targeted, interactive educational programs, widely advocated among respondents, also need to be continued to keep public attention directed toward the probability of recurrent wildfires.

A handful of the interviews identified an interesting exception over the acceptance of private property regulations regarding weeds. It would be useful to understand in subsequent research why landowners may be more receptive to weed management objectives than other types of land use regulations such as fuel reduction. Perhaps the memory of the significance of agriculture in rural areas grants special dispensation, and weeds are simply an exception. Regardless of regulatory acceptance, the enforcement of regulations will remain a sensitive issue for agency officials and neighbors alike.

Coordination among organizations and groups of landowners appears to be an ongoing challenge to realize the lower stand densities, effective road systems, water sources, and other infrastructure that affect firefighting strategies. A widespread belief of the most consistent benefit of fuel reduction in the urban interface is its improvement in fire suppression potential. Yet fire suppression is much more than a thinned forest. It includes all the other attributes named above. Without adequate road access for a safe escape ,firefighters will not enter even well-treated areas during a fire. Perhaps if fuel reduction in the urban interface is repackaged as a firefighting strategy instead of a healthy forest initiative, it might have more traction with those skeptical about the motives of federal land management agencies. Similarly, projecting fuel reduction as more of an aesthetic improvement than a risk reducing improvement might encourage at least some elements of the population toward greater adoption (Daniel et al. 2002).

Results from this research are inconclusive regarding the effect of the CWPP on management opportunities in designated wilderness. If anything, results seem to indicate that use fires in wilderness will be guided more by physiographic, weather, and demographic conditions, instead of the intensity of treatments in the wildland urban interface. Because of the location of the Selway-Bitterroot Wilderness and the tendency of prevailing winds to drive fires quickly into inhabited areas of the central and northern portions of the valley, it seems unlikely, notwithstanding the comments of several respondents, that additional fuel reduction projects catalyzed by the CWPP will change suppression protocols for the Selway-Bitterroot. Informants with considerable experience in fire suppression in the Bitterroot acknowledge that even one burning tree can present a far-reaching, down-slope risk under high wind conditions. In addition, the Selway-Bitterroot already engages in an active wildland fire use program, as it has for many years. This will likely continue at its own pace. However, fuel treatments in the

wildland urban interface in the southern parts of the Bitterroot Valley, where human habitation is not nearly so close to the wilderness boundary, might give wilderness fire managers more confidence that "use fires" that burn in the more southern portions of the Selway-Bitterroot will not progress so rapidly that they will enter inhabited areas before effective suppression can take place. The proximity of housing in the central and northern portions of the valley to the wilderness boundary make it appear that the fuel treatments in this zone will have only a marginal impact on fire management decisions in this wilderness.

Conclusion

This exploratory research demonstrated that there is not a social consensus about the best approach for a community to address the risk from wildland fire. Although there is agreement to protect lives and property, the most effective combination of treatments to do so remains in contention. The treatments of the wildland urban interface raise a series of both social and ecological uncertainties. A much more active research agenda on the consequences of thinning and other common fuel reduction treatments to both ecological and social variables will need to be sustained. Although this research could not review the literature on ecological knowledge regarding fuel treatment impacts, at least among respondents, it was apparent that there are multiple unknowns concerning soil productivity, regeneration, future fire behavior, the spread of noxious weeds, and the interactions of treatments on wildlife and other biota that move seeds and facilitate nutrient exchange. Social variables also need more detailed investigation, such as the mobilization of public action during intervals where risks are non-evident and the range of economic opportunities under different market conditions and treatment scenarios. Multiple strategies to encourage landowners to initiate and maintain fuel treatments will need to be tested and evaluated. Future research also needs to address the effectiveness of incentive/disincentive strategies, such as insurance premium hikes for non-compliant ex-urban developments. Other types of cost-share agreements that might encourage new sources of labor activity in fuel management, such as youth conservation corps, might create additional incentives for adoption.

The ability to consolidate treatments across a geographic unit – to "block up" treatments to use the words of a respondent – will be important to test treatment effectiveness. It's unknown how serious a threat is posed by an untreated 20 or 40 acre tract of private land unit in the midst of more fully treated areas. Coordination across boundaries between National Forests and private ownerships will also demonstrate a test of agency support to community-driven efforts, and new authorities under the HFRA should allow the Forest Service to more quickly implement proposed actions regarding hazardous fuels. Since the community remains divided over the wisdom of widespread treatments in the wildland urban interface, and the availability of resources to complete treatments is limited, careful choices will need to be made to ensure that actions focus on areas that do not threaten other values such as large, old trees or critical wildlife habitat.

The action-orientation of the Bitterroot CWPP and the grant monies acquired for treatments have created a positive impression of the CWPP among many Bitterroot residents. The increased potential to reduce risk from wildfire by treating defensible space is widely applauded. Because of powerful social objectives to protect personal discretion among private property owners, the Bitterroot Community Wildfire Hazardous Fuel Risk Reduction Plan cannot be absolutely successful in reducing risk among all owners in the Bitterroot. The incentives for action also diminish as awareness of fires fades into memory, but with an ongoing drought in the West, fires may be a common summer visitor. Creating lower density stands across various neighborhoods might have an ongoing impact on the people who observe them, especially if they seem aesthetically attractive. More importantly, if the treatments in both defensible space and hazardous fuel reduction at the larger scale reveal demonstrable advantages when the next fire rolls through, then the adoption of these practices and the salience of the CWPP will likely expand. To its credit, the Bitterroot CWPP recognizes the need to make progress on the issue of risk reduction instead of demanding full compliance. This step in a defined direction allows it to be evaluated as a successful public document, even if it makes only a modest improvement in the current situation.

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